

is much longer and thicker and generally of a brighter yellow.

The song is also different from that of the smaller northern form, and will be described elsewhere.

Type of *Ammomanes deserti mya*: ♂, no. 200. Oued Mya, 7. iv. 1912. In the Tring Museum.

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XXIX.—*New Species of Heterocera from Costa Rica*.—XVII.

By W. SCHAUS, F.Z.S.

Geometridæ.

Subfam. *BOARMINÆ*.

*Semiothisa lydia*, sp. n.

♀. Body brownish grey, with some darker irrorations on abdomen. Wings greyish white, almost obscured by grey striæ, and some scattered black irrorations; lines grey-brown; medial line coarse, wavyly dentate; postmedial fine, lunular dentate, closely followed by a broad dull shade of the same colour, reaching termen, but slightly mottled with ground-colour on termen at middle of outer margins. Fore wings; a fine antemedial line angled on subcostal; a dark streak on discocellular; some white mottlings at apex. Hind wings: a black discal point. Wings below whiter, mottled with grey-brown striæ; the veins yellow-brown; the lines dark brown; the postmedial lunular and the shade following it narrower; on fore wings the white ground-colour is partly shaded with yellowish. Outer margin of fore wing sinuous, of hind wing bluntly angled.

Expanse 26 mm.

*Hab.* Tuis, Sixola.

*Semiothisa delia*, sp. n.

♀. Very similar to *S. lydia*, Schs.; the outer margin of fore wing more deeply sinuous, of hind wing more sharply angled; ground-colour whiter, the markings all dark brownish slate-colour; the hind wings with medial line much broader, suffusing with striæ to near base. Underneath the same difference in colour is noticeable, and the veins are dark brown, not yellow-brown.

Expanse 28 mm.

*Hab.* Juan Vinas, Sitio.

*Apicia flexilis*, sp. n.

♂. Palpi and frons brown. Vertex grey. Collar grey, mottled with fuscous. Thorax and abdomen whitish buff, the latter irrorated with black dorsally. Wings whitish buff to outer line, then tinged with lilacine brown, thinly irrorated with black scales, partly connected by dark striæ, chiefly on hind wings; black discal points. Fore wings: antemedial line very fine and indistinct, outangled, marked by a darker point on subcostal; outer line from apex to middle of inner margin lilacine white, finely wavy, preceded by a dull green shade and some black in places; subterminal fuscous points between veins 3 and 4, and 5 and 6. Hind wings: a post-medial line near cell like outer line of fore wing; a faint subterminal lilacine line, preceded by a dull green shade. Wings below dull whitish; a subterminal broad brownish shade suffusing with greyish termen at apices and at tornus of fore wing. Fore wings heavily striated with brown; traces of a fuscous outer line; a black line on discocellular. Hind wings: some striæ on costal half; a black discal point.

Expanse 27 mm.

*Hab.* Carillo, Puriscal.

*Pyrinia rufinaria*, sp. n.

♂. Head purple-brown. Collar grey, irrorated with purple-brown. Thorax and wings reddish brown. Abdomen orange-brown. Wings with darker striæ; outer margins glossed with lilacine slate; outer line dark reddish brown, slightly wavy, outwardly shaded with slate. Fore wings: costa whitish grey, spotted with black, broadest on basal half; a reddish-brown medial line, angled at end of cell and inwardly shaded with slate; a black point on discocellular; the outer line expanding on costa. Wings below orange, striated with dark red. Fore wings: a medial purplish blotch at end of cell and one from cell to inner margin; the shading following outer line bifurcating at vein 3 to tornus. Hind wings: the outer line purplish; the termen shaded with red.

Expanse 28 mm.

*Hab.* Juan Vinas, Tuis, San Mateo.

*Metanema striolata*, sp. n.

♂. Antennæ pectinated. Head, collar, and thorax dull greyish brown. Abdomen brighter brown. Wings light

brown, with long darker brown striæ; fuscous discal points; lines fine, dark brown. Fore wings: antemedial line faintly angled on subcostal and submedian; a faint postmedial brownish shade, outcurved beyond cell; outer line subterminal, followed by a white point on costa, angled at vein 7, slightly sinuous. Hind wings: the subterminal line slightly sinuous. Underneath whitish buff, irrorated with grey-brown; the subterminal line fine, straighter; the discal points minute.

Expanse 31 mm.

♀. The lines darker, outwardly shaded with fuscous, especially the subterminal. The outer margins more sharply angled at vein 4.

Expanse 29 mm.

*Hab.* Juan Vinas.

Somewhat like *Anisoperas atropunctaria*, Wlk., but brown, and the outer line much nearer termen.

*Microgonia amicaria*, sp. n.

♂. Head and thorax brown. Abdomen above grey-brown. Fore wings: base brown, limited by the antemedial fuscous line, which forms three curves marked by grey points on median and submedian, by some dark grey shading on inner margin, and is preceded by some fine whitish lines on extreme costa; medial space fuscous brown; a black point at end of cell, faintly edged with dark grey; a postmedial outbent whitish line on costa to vein 7, then an inbent series of whitish points on veins connected by an indistinct lunular fuscous line; a large light brown and whitish subterminal spot on costa, crossed by black striæ and outwardly edged with white; a subterminal, fine, interrupted, dentate, fuscous line. Hind wings brown, the basal half shaded with fuscous; the postmedial line with the points less distinct; some black striæ on outer half and traces of subterminal line. Wings below pale brownish grey, with fine black striæ and irrorations; black discal points; a postmedial fuscous line, followed by a broad brown shade not reaching termen.

♀. Thorax and wings richer brown, the lines more distinct, heavier, grey; the subterminal fuscous, partly shaded with grey. Fore wings: a large round grey spot at end of cell containing a black point; the medial space only slightly darker; the subterminal costal spot more heavily edged with white; some scattered white irrorations. Hind wings: grey and whitish irrorations near lines and along inner margin; a small round grey discal spot containing a black point. Wings below as in male, the termen whiter.

Expanse, ♂ 51, ♀ 50 mm.

*Hab.* Juan Vinas.

*Oxydia obtusaria*, sp. n.

♂. Palpi and head brown. Collar and thorax yellow-buff. Abdomen and wings buff-grey, faintly tinged with lilacine and with scattered black irrorations. Fore wings: a fine brown antemedial line, outcurved in cell; outer line dark brown, more heavily marked except on costa, angled just below vein 7, and inbent to inner margin beyond middle, followed by a dentate fuscous shade from veins 7-2; a black point at end of cell. Hind wings: a medial fuscous line. Wings below darker, browner, more thickly irrorated with black; black discal points; a broad postmedial pale reddish-brown shade and faint traces of the lines.

Expanse 48 mm.

*Hab.* Juan Vinas, Poas.

Allied to *O. platyptera*, Gn., but the falcate apex short and blunt; it is a variable species in colour, and the outer line is sometimes followed by whitish spots at veins 2 and 3.

*Certima annaria*, sp. n.

♂. Body light brown, the collar and thorax darker, mottled with lighter scales. Wings light brown, palest on medial space, striated with reddish brown to outer spots and on termen with fuscous brown. Fore wings: antemedial black and grey points on veins, followed by a dull olive-brown shade; a postmedial reddish-brown dentate lunular line, inbent, so the medial paler space is very narrow on inner margin; an outer row of black and grey points on veins, slightly inset on veins 5, 2, and submedian, connected by a dull greyish-brown shade; cilia with small dark brown spots at veins. Hind wings: a reddish-brown medial line; the outer spots outcurved, also connected by a broad dull greyish-brown shade; cilia tipped with grey. Wings below yellowish, with a few dark striæ; dark streaks on discocellular; a broad subterminal dark purplish-brown fascia, expanding to termen between veins 4 and 5 on fore wing and vein 4 to fold on hind wing.

Expanse 36 mm.

*Hab.* Juan Vinas.

*Isochromodes bellona*, sp. n.

♀. Body light brown; a black dorsal tuft at base of abdomen. Wings light brown, with a few scattered black striæ and irrorations; black discal points; cilia with black spots, the largest at veins 2 and 3. Fore wings: antemedial small

dark brown spots on veins, the one on submedian a little larger and preceded by some grey scales; a postmedial reddish-brown shade, linear from vein 3 to inner margin; an outer row of small black spots, close to postmedial from vein 3, followed from below vein 4 by a dark grey and black shade; a black spot at apex; a subterminal black spot below vein 3 and a terminal wavy black mark from just above 4 to vein 2. Hind wings: inner margin medially shaded with reddish brown, followed by irregular black markings to anal angle. Wings below buff, with a few dark irrorations; black discal points; the outer spots in a straighter line and followed by a broad fuscous shade.

Expanse 26 mm.

*Hab.* Juan Vinas.

Near *I. brumosa*, Dogn.

*Therina silanaria*, sp. n.

♀. Palpi, body, and fore wings slate-grey. Head yellowish. Fore wings: a black point on discocellular; a fine whitish outer line from below costa, outcurved and inbent to near middle of inner margin, interrupted and consisting partly of whitish striæ, increasing on inner margin; a small white spot striated with grey near apex. Hind wings light silky grey.

Expanse 33 mm.

*Hab.* Poas.

*Therina? perpectinata*, sp. n.

♂. Antennæ with exceptionally long pectinations finely ciliated. Head and thorax olive-black; some reddish-brown scales on vertex. Fore wings silky olive-brown; a black point at end of cell; a fine outer black line, vertical on costa, then slightly outcurved; a small subterminal yellow spot between veins 7 and 8. Hind wings dark silky grey; a minute black point on discocellular. Underneath dark silky grey, with black discal points.

Expanse 40 mm.

*Hab.* Ojo de Agua.

*Macrolyrcea sceva*, sp. n.

♂. Body and wings dark olive, the wings shaded with silky grey except between medial and outer lines. Fore wing: a fine wavy subbasal line, dark olive; autemedial dark olive, outbent on costa, angled in cell, inbent and slightly

wavy; medial line angled beyond cell, suffusing with the dark olive postmedial space, which is limited by a slightly sinuous, fine, lilacine line; an elongated pale buff space, striated with olive-brown on costa, preceding the outer line; a dark olive shade on outer margin from vein 5 to termen above tornus. Hind wings: the medial dark shade very narrow; the postmedial line nearly straight, barely visible; some scattered fuscous striæ on outer half. Wings below olive-brown, thickly striated with buff-grey; the fore wing with costa whitish; the termen broadly clear dark olive-brown, and a straight subterminal white line; a dark streak on discocellular; hind wings with scattered black irrorations and a very indistinct outer line, nearly straight.

Expanse 46 mm.

♀. Body and wings buff-brown, the latter with darker shades and striæ; antemedial line lunular on costa.

Expanse 50 mm.

*Hab.* Poas.

Near *M. nondina*, Dr.; differs in colour, in the absence of black discal points, and in having the medial and outer lines closer together. *M. nondina* has the postmedial line on hind wings distinct and sinuous both above and below.

*Alcis herse*, sp. n.

♂. Palpi and frons black mottled with grey. Vertex grey; a black line between antennæ. Collar, thorax, and abdomen light grey, thinly irrorated with black; a transverse black line at base of abdomen and pale buff segmental lines. Wings white, with a few dark irrorations. Fore wings: costa, base, and termen shaded with grey; dark striæ on costa and fuscous spots at origin of lines; a fine subbasal shade; a fine black antemedial line, inbent below cell, preceded by a curved greyish shade; a greyish spot at end of cell, edged by a fine fuscous line; a fine medial line, outcurved around discocellular; postmedial fine, remote on costa, vertical at first, bluntly outcurved across vein 5, then sinuous and incurved, approximating medial line from veins 4 to 3, and from fold to inner margin, followed throughout by a brownish shade; subterminal white, finely lunular; dark marginal points on interspaces and a fine terminal black line. Hind wings: a black line at base; medial line fine, black, sinuous, heaviest on inner margin; a semilunar outlined spot at end of cell; postmedial fine, wavy to below vein 6, then barely incurved, followed by a brownish shade; subterminal wavy, lunular. Wings below white. Fore wings: costa

heavily striated with black; a fuscous streak on discocellular; termen fuscous, narrowest at tornus, mottled with white between veins 3 and 4. Hind wings: a fine medial line from costa to discocellular; a narrow marginal fuscous shade from apex to near vein 4.

Expanse 31 mm.

*Hab.* Avangarez.

Sometimes the antemedial and postmedial lines on fore wings expand on inner margin into fuscous blotches.

*Alcis aglauros*, sp. n.

♂. Head, collar, and thorax dull brownish grey; a few brown irrorations on collar. Abdomen paler, with dark segmental lines. Fore wings pale brown, tinged with lilacine in cell and with whitish medially below cell and just beyond cell; some scattered dark irrorations and black striæ on costa; a faint subbasal fuscous shade; antemedial fine, black, angled on subcostal, then slightly inbent, marked by a small black spot on median; a fine medial line, crossing a large greyish spot at end of cell and marked by dark points on median, vein 2, and submedian; postmedial fine, black, somewhat incurved on costa, bluntly angled across vein 5, then inbent, wavy; subterminal whitish, wavyly dentate, preceded by a fuscous shade above and below vein 5, and there followed by dark streaks to termen; dark terminal points on interspaces connected by a lunular line. Hind wings whitish at base, otherwise pale brown; medial line fine, black, downbent towards inner margin; an oval dark line on discocellular; postmedial bluntly angled at vein 6, then incurved; subterminal more deeply dentate. Wings below pale brownish. Fore wings: a large fuscous spot at end of cell, and a similar subapical patch from below vein 5 to vein 9; traces of postmedial beyond cell; terminal points on interspaces. The hind wings immaculate.

Expanse 35 mm.

*Hab.* Juan Vinas.

*Alcis pandrosos*, sp. n.

♂. Head and collar grey; thorax whiter grey, with a few dark irrorations; abdomen grey, with whitish segmental bands. Fore wings grey-white, thinly scaled, with a few pale greyish striæ and darker irrorations; terminal third shaded with pale greyish brown; costa pale brown, with dark striæ and fuscous spots at origin of lines; a faint subbasal, straight, brownish shade; antemedial line fine, black,

minutely wavy and nearly vertical, preceded by a faint brownish shade; a large greyish spot over discocellular; postmedial line fine, fuscous brown, minutely wavy, vertical from costa to vein 5, then inbent, preceded from vein 2 to inner margin by a fuscous shade; fuscous streaks above and below vein 5 to near termen; a subterminal dentate whitish line, suffusing with a terminal whitish shade between veins 7 and 8; marginal small dark spots on interspaces. Hind wings: basal half whiter, with a few fuscous irrorations above and below cell; a medial brownish line, irrorated with black, geminate, followed by an oval line on discocellular; the postmedial fine, black, angled at discal fold, then incurved; the outer half brownish; a whitish line near postmedial; the subterminal white, more deeply dentate than on fore wing. Wings below dirty white; a broad marginal fuscous shade, not quite reaching termen; a fuscous spot at end of cell on fore wing.

Expanse 36 mm.

*Hab.* Sixola, Tuis, Juan Vinas, Guapiles.

*Nesalcis leuca*, sp. n.

♂. Head olive-brown; a dark brown shade between antennæ. Thorax brownish grey. Abdomen brownish white; a fuscous line at base of abdomen and brownish segmental lines, interrupted dorsally. Wings dirty white, thinly irrorated with dark brown; an outer, slightly curved, fuscous-brown lunular line, outwardly toothed on veins; the veins pale orange-brown, interrupted before the subterminal, which is whitish, lunular; a faint brownish shade follows both the postmedial and subterminal; terminal fuscous-brown spots on interspaces; a small fuscous spot on discocellular. Fore wings: a fine fuscous antemedial line; a faint postmedial lunular dentate line, suffusing with outer line just below vein 2. Hind wings: a fine brown medial line. Underneath whitish; faint discal points; the outer line visible through wings; costa of fore wings yellowish striated with brown.

Expanse 35 mm.

*Hab.* Juan Vinas, Avangarez.

Smaller and less brilliantly coloured than *N. cræsaria*, Schs.=*regularis*, Dogn.

*Leucula cachiaria*, sp. n.

♂. Head black, thinly scaled with white. Body and wings



white, the latter thinly scaled. Fore wings: the edge of costa at base black; a fine medial smoky line, angled on subcostal and inbent to near base of inner margin; a black spot at end of cell; outer line from costa near apex to inner margin beyond middle. Hind wings: a smoky medial line followed by a black point on discocellular below vein 6; a subterminal smoky spot below vein 6 and one on inner margin. Fore wings below with a postmedial small black spot on costa.

Expanse 24 mm.

*Hab.* Cachi, Juan Vinas.

*Nipteria fronsaria*, sp. n.

♂. Palpi dark brown. Frons deep yellow; vertex, collar, and patagia whitish grey. Thorax and abdomen dark grey. Wings thinly scaled greyish white; veins brownish grey; discocellulars finely darker. Fore wings: an outer dark grey line from costa before apex to inner margin beyond middle, more heavily marked towards costa; the costal margin more heavily scaled and whitish; cilia white, tipped with dark grey. Hind wings: a faint darker postmedial line. Underneath white, the veins more heavily marked, especially on hind wings; the outer line well marked.

Expanse 24 mm.

*Hab.* Guapiles.

*Nipteria mitellaria*, sp. n.

♀. Palpi dark grey. Head and collar yellow; some orange-brown shading on vertex and collar behind. Thorax, abdomen, and wings grey, the wings thinly scaled. Fore wings: a darker grey medial shade, inbent on inner margin; a similar postmedial shade, slightly angled at vein 5; a darker grey line on discocellular. Hind wings: a subterminal darker grey line.

Expanse 31 mm.

*Hab.* Tuis.

*Astyochia lachesis*, sp. n.

♂. Palpi dark brown. Head, collar, and patagia yellow. Thorax and abdomen greyish buff. Wings whitish grey; veins, lines, discal spots, and some terminal striae fuscous grey; cilia white, shaded with grey at veins. Fore wings: antemedial inbent from subcostal; subcostal and median

darker from near base to just beyond antemedial; outer line outcurved, irregular. Hind wings: discal spot large; outer line outcurved; the termen of both wings rather more heavily scaled. Underneath whiter, the lines duller.

Expanse 27 mm.

Hub. Tuis.

[To be continued.]

XXX.—*A new Species of Tabanus from German East Africa, in the British Museum (Natural History).* By ERNEST E. AUSTEN.

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*Tabanus trianguliger*, sp. n.

♀.—Length (22 specimens) 13·6 to 16 mm.; width of head 5 to 5·6 mm.; width of front at vertex 0·8 to 1 mm.; length of wing 12 to 13·4 mm.

*Dusky species (dorsal surface of abdomen in rubbed specimens more or less cinnamon-rufous), with upper surface of body bearing conspicuous, light-grey markings; front moderately broad and of uniform width; dorsum of thorax longitudinally striped with grey; dorsum of abdomen bearing three longitudinal series of large, smoke-grey or drab grey triangles, so that the ground-colour is reduced to a minimum; wings faintly tinged with drab, almost hyaline; femora pale (greyish fawn-coloured or greyish ochraceous buff), inner surfaces of front pair more or less dark brown.*

*Head:* subcallus pale cream-coloured pollinose; face, jowls, and basioccipital region whitish pollinose and clothed with white hair; occiput light grey pollinose; *front* smoke-grey, clothed with short, yellowish hair, but with a darker, black-haired patch on vertex, and a similar patch in the middle; front (estimated by eye) about four times as long as its breadth at lower extremity, inner margins of eyes bordering it parallel or only very slightly convergent below; *frontal callus* rather large, dark brown, not very shining, roughly quadrate in shape but with its angles (at least the upper pair) rounded off; traces of a second, similarly coloured, elongate (more or less elliptical) callus are usually distinguishable in the centre of the median dark patch; proximal joint of *palpi* greyish cream-buff, clothed with